ployed in his grandfather's glue factory, and he followed this up with new forms of centrifugal machines, evaporators, and other devices for use in breweries. He made many experiments and a number of inventions in connection with motor vehicles and flying machines, and in later years devoted a considerable amount of time to the study of the helicopter.

About 1898 Dr. Cooper Hewitt directed his attention to electrical science, and became a contributor to scientific discovery in a diversity of fields, from wireless telegraphy and telephony to a special process for the electrical welding of steel. However, his name is probably best known in connection with his fundamental work relating to the mercury vapour arc which he brought into commercial use when he founded, in conjunction with the late Mr. George Westinghouse, the Cooper Hewitt Electric Company of New York, and the Westinghouse Cooper Hewitt Company, now known as Hewittic Electric Company, Limited, in England. His original work on the mercury vapour rectifier has been followed up until this apparatus has become a most useful adjunct to the dynamo, not only in street lighting but also in the serious work of power distribution, and it has not yet been brought to its full industrial value. A generation hence the world will have begun to reap some of the larger benefits conferred by the discoveries of this notable scientific worker.

We regret to learn of the death of Mr. Bingham Newland, an observant and original naturalist, author of "What is Instinct?", which was reviewed some time ago in these columns. Mr. Newland held very strong views in regard to the infallibility of the subconscious mind in animals, and thought of this as strangely detached from individual testing, experimenting, and learning. Perhaps what he was feeling towards was a theory of the germinal origin of new departures in instinctive behaviour. Another of his amiable heresies was a belief in "mind-blending" or telepathic communication in birds, by means of which effective co-operation is achieved. Mr. Newland's original and independent mind was handicapped by ill-health, but he had the reward of all those who read deeply in the book of Nature.

Notes.

We much regret that the reference to the Calcutta munitions case in last week's Nature, p. 160, did not accurately represent Sir Thomas Holland's position in the matter. It was Sir Thomas Holland himself who, acting on the highest motives and after consultation with two members of the Viceroy's Council, ordered the withdrawal of the prosecution, but when all the facts are published we believe that the real reason for his action will reveal more than the stated reason as to the harm that might be done to Indian industrial development if it succeeded. As the Government of India could not support the view publicly stated, Sir Thomas Holland's resignation of the post of Minister of Industries naturally followed. Later, however, it was officially announced that the prosecution would not be proceeded with because "widespread commercial and industrial interests would be seriously affected," though when the Advocate-General withdrew from the case on August 6 he declared that all the charges could be proved. This decision seems, therefore, to support Sir Thomas Holland's action; and, notwithstanding the suggestion that the Minister of Industries should have received legal training, his reputation as a scientific administrator is safe with all who realise what the building-up of the Indian Munitions Board during the stress of war meant for India, the Entente Powers, and the final victory.

In memory of those lost in R38 and in previous airships, a decision to establish a fund for airship research has been made by the council of the Royal Aeronautical Society. It is believed that such a course of action would most nearly meet the wishes of those who have lost relatives and friends in the disaster. It is important for the country that the lessons should not be lost, and the view of those most closely connected with airships is that analysis of the causes of the breaking of R38 in the air can give the foundation for a sound system of construction. Such a result would afford some comfort to the relatives of the officers and men who gave their lives for progress, and, in view of the well-known decision of the Air Ministry to cease all work on airships, it is desirable that others should take up the problems connected with their development. The memorial fund is to be devoted to this end. Over the signature of Lord Weir, the president of the society, an appeal for contributions has just been issued, with the suggestion that they should be sent to the Secretary, Royal Aeronautical Society, 7 Albemarle Street, London, W.1.

The *Times* announces that Mr. Knud Rasmussen's ethnological expedition to the Canadian Arctic Archipelago left Godthaab, on the south-west coast of Greenland, on September 7 in the motor schooner *Sea King*. On his arrival in Greenland in the early summer Mr. Rasmussen went to Thule, near Cape York, to secure Eskimo, dogs, and furs for his expedition. Some delay was caused by pneumonia spreading among the Eskimo and causing two deaths. After a call on the coast of Labrador the *Sea King* will sail for Lyon Inlet, in the Melville Peninsula, which will be the base for the first winter. From there the little-known tribes around Fury and Hecla Strait will be visited by sledge journeys. In the spring of 1922 Mr. Rasmussen plans to move south to Chesterfield Inlet in order to pick up stores sent north by the Hudson Bay Co., and he will then visit tribes in the Barren Lands and along the shores of Coronation Gulf before returning to Lyon Inlet. The next news of the expedition may be expected from St. John's, Newfoundland, when the *Sea King* returns during the autumn.

THE Royal Microscopical Society has arranged to include in the programme of ordinary meetings during the coming session a series of papers dealing with the practical uses of the microscope in industrial research. A provisional list has been issued of the communications to be read, and from this it appears that a wide range of subjects will be covered by a number of competent authorities. Metallurgy, physical optics, glass, leather, coal, medical research, and brewing, all in relation to the microscope, are among the topics which will be discussed. The first two papers will be read on October 19, when Dr. L. T. Hogben will read a communication entitled: "Preliminary Account of the Spermatogenesis of Sphenodon," and Mr. D. M. Stump will communicate a paper entitled "An Application of Polarised Light to Resolution with the Compound Microscope." Announcements of further papers will be made from time to time in the Diary of Societies published in our columns.

AT a recent meeting of the American Astronomical Society, held at Middletown, Connecticut, Prof. C. V. L. Charlier was elected an honorary member. The only other living astronomers who have been thus honoured are Prof. J. C. Kapteyn and Sir Frank Dyson.

THE fourth annual Streatfeild memorial lecture is to be delivered at the Finsbury Technical College, Leonard Street, E.C.2, by Mr. W. P. Dreaper, on Thursday, October 20, at 4 o'clock. The subject will be "Chemical Industry a Branch of Science." Admission will be free.

THE first general meeting of the Society for Constructive Birth Control and Racial Progress will be held on Thursday, October 13, at 8 p.m., at the Lecture Room, Hotel Cecil, Strand, W.C., when Dr. Marie Stopes will deliver her presidential address, entitled, "Anecdotes of the Past, Present, and Future of Birth Control."

THE Committee of Privy Council for Medical Research has appointed Sir F. W. Andrewes and Sir Cuthbert Wallace to fill the vacancies on the Medical Research Council caused by the retirement of Mr. C. J. Bond and Prof. W. Bullock, in accordance with the provisions for rotation made in the Royal Charter under which the council is incorporated.

IT is announced that Mr. D. Frain, agriculturist, Nyasaland, has been appointed to be senior district agricultural officer in Tanganyika Territory; Mr. H. A. Dade to be assistant mycologist in the Department of Agriculture, Gold Coast; and Mr. J. A. Robotham to be assistant agricultural superintendent, St. Kitts-Nevis.

THE New York correspondent of the *Times* reports that at Dayton, Ohio, Lieut. J. Macready made a new height record when flying a Lapero biplane on September 28. Ice formed in his oxygen tank at 39,000 ft., but his engine carried him on until the altimeter registered 40,800 ft. Lieut. Macready came down and made a successful landing after being 1h. 47m. in the air.

CHARLES DARWIN'S birthplace, known as The Mount, Shrewsbury, situated in that part of the town known as Frankwell, has been purchased by H.M. Office of Works. The house was built about 1800, and at the time when Sir Francis Darwin wrote, in 1887, "The Life and Letters of Charles Darwin," it had undergone but little alteration. It was "a large, plain, square, red-brick house, of which the most attractive feature" was "the pretty greenhouse, opening out of the morning-room."

IT is announced in the *Revue Scientifique* of September 24 that the first award of the Marcel Benoist prize of 20,000 francs has been made to M. Maurice Arthus, director of the Institute of Physiology at Geneva. The prize was founded by M. Benoist, of Paris, who bequeathed his whole fortune to the Federal Council of Switzerland in recognition of the care and attention which he received in that country. An award will be made annually to the man of science who, having been domiciled in Switzerland for five years, is judged to have made the most noteworthy contribution to science, particularly in relation to human life, during the preceding year.

AT the recent meeting of the Hull Museums Committee the curator reported that when in London recently he heard that the specimens in the museum at the Royal Albert Institute, Windsor, were in rooms which were required for other purposes, and that there was an opportunity of obtaining the collections. He consequently visited Windsor, with the result that the whole of the specimens are now in Hull, and among them are many valuable additions to the antiquities and geological and natural history series already there. Particular mention may be made of some pre-historic Bronze Age and Stone Age weapons, a large collection of Roman lamps and pottery, Greek vases, and a miscellaneous series of medieval antiquities. Otherwise the objects are such as were to be found in museums of this character in the early part of the last century. Fortunately a handbook to the collections, written by Mr. J. Lundy, was published many years ago.

A COMPANY has been incorporated, under the name of British Trade Ship, Ltd., with Earl Grey as chairman, for the purpose of carrying out the project of organising a floating exhibition of British goods which shall visit the chief ports of the world. A new vessel of 20,000 tons register is to be constructed in the yards of Messrs. Swan, Hunter and Wigham Richardson, Ltd., and it is intended that she shall leave the Thames in August, 1923, on a tour of more than 42,000 miles, returning to London in February, 1925. South America, South Africa, Australia, New Zealand, Fiji, and Japan will be visited on the outward voyage, and the ship will return *via* China, India, and the

Suez Canal. The ship will be 550 ft. long, with an extreme breadth of 74 ft. 9½ in., and a moulded depth of 44 ft. 6 in. to the shelter deck. She will be built after the style of a first-class liner so far as accommodation for trade representatives, etc., is concerned, but her special feature will be four exhibition decks, long clear spaces the full width and the full effective length of the vessel, and 10 ft. in height between decks. Compressed air, electricity, running shafting, and probably steam and hydraulic power will be provided for exhibitors who may desire to give working demonstrations of their machinery. Other interesting particulars regarding this vessel are given in *Engineering* for September 23. There is no doubt that the scheme will be valuable in carrying out much-needed propagandist work.

"SPEECH in the Silent World" is the title of an address delivered by Sir Leslie Mackenzie at the annual meeting of the Edinburgh Royal Institution for the Deaf and Dumb, in which teaching the deaf mute to articulate is discussed. The author believes that the impulse to speak is almost universal. The normal child at a certain stage acquires language with extraordinary rapidity, and the same obtains with deaf children if they be of normal brain. For the latter the problem of training in articulate speech is like the problem of training in the speech of gesture, namely, how to use a series of motions to express a meaning. Through the series of motions visible to the eye the teacher of lip-speech trains the vocal organs in the formation of sounds with meaning, and the teacher of lip-speech, working on the irresistible impulse towards expression, develops with amazing rapidity the powers of articulation. The training should preferably commence at the age of two or three years; progress is then much more rapid, for as time elapses the impulse becomes less and less marked, and the training in articulate speech correspondingly more difficult. The directors of the Edinburgh Royal Institution last year opened a nursery school so that the training in lip-speech might be commenced at an early stage of life.

THE presidential address delivered by Sir Baldwin Spencer at the meeting of the Australian Association for the Advancement of Science, held at Hobart, Melbourne, in January last, is devoted to the tangled problems of Australian ethnology. After a succinct review of the work of various explorers he gives the well-needed caution that "investigations carried on amongst the remains of tribes that have been long in contact with white men are liable to be very misleading." As regards land tenure, statements of individual ownership should be accepted with caution, as natives perceive that the private possession of land among white men is evidently a sign of superiority. The existence of a number of local tribes, each with its own distinct dialect, is a difficult problem. The desiccation of the central area probably led to the isolation of its inhabitants from the coastal people, and the progressive deterioration of the climate led to the occupation of districts less exposed to drought, where the absence of a written language encouraged the growth of dialects. The original migrants probably entered Australia at the north-east in Pliocene or very early Pleistocene times. The theory of Dr. Rivers that "the history of Australian culture and its present nature become far easier to understand if there has been a gradual infiltration of seafaring peoples, starting from many points on the coast," is dismissed with the remark: "To anyone who has had experience of the wild native tribes on the northern, north-western, and north-eastern coasts there is very considerable difficulty in accepting the suggestion of Dr. Rivers that small seafaring parties landing at various points would be able, even if they could find sufficient food to live upon, to influence the aboriginals. Personally, at that early date, I should have been very sorry to have formed a member of any such small party." This address is very interesting and instructive, and may be commended to all students of Australian ethnology.

WITH the rapid development of water-power utilisation in Italy, increasing attention is being directed to better methods of inland waterway transport and the improvement of existing ports and the planning of new ones. With a view of facilitating a thorough discussion of questions bearing on this subject, the Associazione Nazionale per i Congressi di Navigazione (National Association for Congresses on Navigation) is holding a Congress on "Inland Navigation and Ports" at Ravenna on October 22–26. The Congress, on this occasion, will be confined to questions relating to inland navigation in Northern Italy and the ports of Ravenna, Ferrara, and Venice. A number of papers will be read, visits paid to port works, and, if time permits, an exhibition relative to inland navigation and port works will be arranged. Among the subjects for discussion are: "A Systematic Plan for the Control of the Waterways of Northern Italy"; "Types and Standard Dimensions of Art-works on Inland Waterways"; "Utilisation of Existing Subsidiary Waterways in Northern Italy"; "Suggested Regulations for Inland Navigation on Existing Waterways"; "The Administrative Control of Maritime Ports"; "Distribution and Co-ordination of the Functions of the large Adriatic Ports"; "Works carried out or schemes approved for the Construction and Improvement of Maritime Ports in Italy"; "Present State of Inland Navigation Works recently completed or in course of Construction in Italy"; "Methods of facilitating the Entry of Ships into Ports in Foggy Weather," etc. Those interested may enrol as temporary members of the Congress on payment of 25 lire (100 lire for a company or association). The papers will be printed and circulated to members of the Congress. The general secretary of the Congress is Signor Mario Beretta, Via della Signora 12, Milan.

IN an article on "The Whaling Industry" in the *Statist* for September 3 Mr. A. F. Bearpark advocates a complete scientific investigation of the industry with the view of preventing its extinction, and not, as the writer frankly admits, in order that whales may be preserved from extermination. He does not believe that the latter eventuality is to be feared from the operations of whalers, because economic considerations would bring about the stoppage of the industry before that could occur. He outlines a schedule of information to be demanded as a basis for legislation when licences for whaling are issued, and urges the infliction of heavy penalties for incomplete and inaccurate returns. Most of the information asked for by Mr. Bearpark is, we believe, already supplied by whaling companies, and the masterly analysis of the statistics for the last eight years presented by Sir Sidney Harmer to the recent meeting of the British Association at Edinburgh does not bear out Mr. Bearpark's contention that the extinction of whales is not to be feared from the operations of whalers. The contrary is, unfortunately, only too clearly probable. Whether from the point of view of the naturalist or the whaler, legislation to regulate the industry is undoubtedly necessary, particularly, as Mr. Bearpark points out and as Sir Sidney Harmer would agree, to prevent the deplorable waste which is associated with floating factories. A little friendly co-operation should result in legislation which aims at the consummation of the desires of both sides, the preservation of whales as part of the marine fauna, and the establishment of the whaling industry on a sound and permanent basis.

RESULTS of meteorological observations made at the Radcliffe Observatory, Oxford, under the direction of Dr. A. A. Rambaut, are published by order of the Radcliffe Trustees for the five years 1916–20. The volume contains daily observations of barometer, air, and evaporation temperatures, solar and terrestrial radiation temperatures, wind direction and velocity, cloud, hours of bright sunshine, and rainfall. Observations of ozone are given twice daily, and there is a summary of the weather and remarkable phenomena. In addition to these daily observations, mean monthly readings of the barometer are given for each of the five years, and for comparison the monthly means for sixty-six years, and similar means of the dry- and wet-bulb thermometers. The highest and lowest air temperatures are also given for the separate months and the monthly amounts of rain, with the means for seventy years, together with similar means of the amount of cloud, bright sunshine, and ozone. The mean amounts of ozone for the several months of the five years 1916–20 are so decidedly higher than the mean for the fifty-four years that it almost suggests that some difference may have occurred in the basis of registration. The lowest temperatures on the grass are tabulated for each month for the sixty years from 1861 to 1920, and the monthly maximum and minimum temperatures for each month in the last seventy years, with the monthly duration of sunshine for each of the last forty years. A diagram is given showing the triennial variation of the velocity of the wind, barometric pressure, and rainfall at Oxford for the years 1859–1920. Such details as those contained in the volume add much to our knowledge of the world's meteorology.

THE Geological Survey of the Union of South Africa has issued Memoir No. 16, which contains a description of the Mutue Fides-Stavoren Tinfields by Dr. Percy A. Wagner. This name has been given to what appears to be one of the most important portions of the Olifants River Tinfields, and the report contains a description of the deposits, their mineralogy, mode of occurrence, etc. The author appears to have come to the conclusion that this field is never likely to play any really important part in the tin production of the world, or even to equal some of the other tinfields of South Africa, but that, nevertheless, it is likely for a considerable time to come to produce moderate quantities of tinstone as well as ores of tungsten and copper.

THE September issue of the *American Journal of Science* contains a paper by Mr. W. D. Lambert, of the United States Coast and Geodetic Survey, in which some of the consequences of the rotation of the earth are pointed out in a way which will be much appreciated by readers not familiar with the mathematical developments of geodesy. The surface of the ocean is not strictly spheroidal, but is rather the rounding down towards a spherical form of a lens-shaped surface with its diameter one and a half times its thickness. If an elongated body of slightly less density than the ocean floats on the ocean, the forces on it tend to make it move towards the equator and set itself with its length along the meridian in latitudes greater than 45°, and at right angles to the meridian in latitudes less than 45°. The motion of the rod of an Eötvös balance tending to set in the prime vertical is also explained, and the possibilities which the modified balance opens up of detecting and studying local irregularities in the distribution of matter near the earth's surface are clearly pointed out.

IT is now well recognised that cod-liver and other fish oils are exceptionally rich in the vitamin-A which promotes growth. So far as is known at present, the only phase in the cycle of living organisms at which this substance is synthesised is that associated with the development of chlorophyll in plants. There is direct evidence that mammals cannot make it, and there is no evidence that any other animals can, though our information on this latter point is very scanty. In an interesting paper (*Biochemical Journal*, vol. 15, p. 530) which opens up a number of problems in the general biology of the growth-substance, K. H. Coward and J. C. Drummond raise the question as to where the fish get their store of vitamin from. They show by appropriate feeding experiments that green seaweeds contain a good deal, and they suggest that these form the ultimate source of the virtues of cod-liver oil, the cod obtaining them through the smaller animals on which it feeds by an unknown number of links, the last of which feeds on the seaweed. Attractive as it is at first sight, it may be doubted whether this explanation is quantitatively sound; the amount of seaweed in the sea is relatively very small, and it is indeed only a small fraction of even shallow waters that have a substantial growth on the bottom. It would be interesting to know the vitaminic relations of the plankton and some of the marine invertebrates.

A work that should be of scientific and economic importance is included in the list of announcements of the Oxford University Press, viz. :—"Ocean Research and the Great Fisheries," by G. C. L. Howell. Among the subjects dealt with are the great fisheries, the organisation of ocean research, the plaice question, the turbot and turbot culture, the soles, the haddock problem, Norwegian haddock investigation, the cod, the coalfish or saithe, the halibut, the hake fisheries, business men on hake problems, Dr. le Danois on the hake, the skates and rays, the ling, the whiting, and lemon soles. Another book appealing to readers of Nature is "The Life and Scientific Correspondence of James Stirling," by C. Tweedie.

Messrs. L. Oertling, Ltd., Turnmill Street, London, E.C.1, inform us that Sir Ernest Shackleton has taken an Oertling balance with him on the *Quest*. An Oertling balance was also taken by Admiral Sir George Nares on his expedition in 1873, and the same balance was used by the late Capt. Scott in his expedition in 1901, and during the war it was used in the Science Museum at South Kensington. It speaks well for the trustworthiness of an instrument which can be of service fifty years after the date of its manufacture.

Messrs. George Bell and Sons, Ltd., announce for early publication a revised and enlarged edition of Madison Grant's "The Passing of the Great Race; or, the Racial Basis of European History," the first edition of which work was reviewed in Nature of August 23, 1917 (p. 502). The new edition will contain a supplement of more than 100 pages, giving references to and quotations from authorities upon the subject treated of by the author.

The firm of Mr. George Ellison, of Perry Parr, Birmingham, has prepared a number of lantern-slides illustrating various types of electric control gear such as oil rotor starters, switchboards, circuit-breakers, etc.; there are also some views of works. These slides will be loaned to engineering and technical societies and technical colleges upon application being made to the firm at the above address.

We have received from Messrs. Reynolds and Branson, Ltd. (13 Briggate, Leeds) their catalogue of first-aid requisites. It includes a series of specially designed cases containing sterilised dressings and other requisites to meet the requirements of Home Office Orders as applied to factories and works.

The latest catalogue (No. 419) of Mr. F. Edwards, 83 High Street, Marylebone, W.1, contains particulars of some 500 works dealing with Central and South America. It will doubtless be of service to those taking an interest in the history and exploration of the regions referred to.

Our Astronomical Column.

Antares and its Companion.—Mr. F. G. Pease has measured the diameter of this star by the interferometer method at Mount Wilson. He obtains the result 0·040″, nearly the same as that for Betelgeuse. The parallax is uncertain, but it is believed to be about 0·009″, which makes the linear diameter 400,000,000 miles. W. S. Adams and A. H. Joy have succeeded in photographing the spectrum of the companion, at the Cassegrain focus of the 100-inch. It is of early helium type B 3, the H and K lines of calcium being fairly sharp, the other lines wide and hazy. Adams and Joy give −2·7 as the absolute magnitude of the primary, which gives +3·2 for the companion. This is unusually faint for a B-type star. The companion is 3·2″ distant, and the common proper motion indicates physical connection. There is no distinct evidence of orbital motion in seventy years.

The Bright Object Near the Sun.—Dr. W. Bell Dawson writes from Ottawa stating that he saw a bright object low in the west in unusually clear air just after sunset on September 4, which he assumes to be the same as that observed at Mount Hamilton on August 7. The identity seems unlikely; Dr. Dawson's object may have been Mercury (R.A. 11h. 36m.: N. Decl. 3° 38′), or Jupiter (R.A. 11h. 45m.: N. Decl. 2° 48′; the Sun was in R.A. 10h. 53m.: N. Decl. 7° 6′). However, it is well to put the observation on record, the mystery of the Mount Hamilton object being still unsolved.

Studies of Nebulæ and Clusters.—M. Camille Flammarion has in recent months contributed a series of illustrated articles on this subject to *L'Astronomie*. The September issue deals with the interesting nebula N.G.C. 4594 in Virgo, the discovery of which is usually attributed to Sir W. Herschel in 1784. M. Flammarion has, however, discovered a manuscript note in Messier's handwriting, showing that his assistant Méchain found it on May 11, 1781. It is suggested that it should be called Messier 104.

It belongs to the class known as spindle nebulæ; they are of regular outline, long and narrow; the width is greatest in the centre, and tapers nearly to a point at each end. Two drawings and two photographs of the nebula are reproduced, the former by Sir J. Herschel and Lassell, the latter by Dr. Isaac Roberts and Mr. F. G. Pease. All four are in good accord, but the photographs show considerably greater width in the centre. Many of the spindle nebulæ, including this one, have a dark central strip, with nearly parallel edges, dividing them longitudinally into two parts. It seems scarcely possible dynamically that this should be a real division, and it is generally assumed that there is an equatorial zone of dark occulting matter encompassing the nebula.

It is believed that the spindles are spirals seen edgewise, in which case they are important as affording a knowledge of the cross-section of the latter; the thickness in the central regions is one-third or one-fourth of the equatorial diameter; this is much the same proportion as that assigned by star-gauges to our own stellar system. This is one of the arguments used in support of the view that the spirals are external galaxies. It has further been suggested that the galaxy may have an outer belt of absorbing matter, like that seen in the spindle nebulæ, which would explain the absence of spiral nebulæ in the galactic neighbourhood.

Sir J. Herschel erroneously gave the position angle of the nebula M. 104 as 102°. The photographs give 89°; there has been no real change, since Smyth in 1837 and Lassell in 1862 both noted it as parallel to the equator.